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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/780,424 | 02/17/2004 | Clayton C. Bohn JR. | 5853-401 | 2023 |
| 30448 | 7590 | 11/03/2005 | EXAMINER | |
| AKERMAN SENTERFITT | | | BASINGER, SHERMAN D | |
| P.O. BOX 3188 | | | ART UNIT | |
| WEST PALM BEACH, FL 33402-3188 | | | PAPER NUMBER | |
| | | | 3617 | |

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/780,424

Applicant(s)

BOHN ET AL.

Examiner

Sherman D. Basinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 26 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 26 and 27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 17, 2005.

Drawings

2. With regard to the replacement sheets of drawings filed October 17, 2006, the sheet with figures 2a and 2b is not approved, the sheet with figure 3 is not approved, the sheet with figures 4a-4d is not approved, the sheet with figure 6 is approved, the sheet with figure 8 is not approved, and the sheet with figure 9 is approved. The sheets not approved because of the dark shading are unclear, especially figures 4a-4d and figure 8. The shading should be removed from these figures.
3. In review: figures 2a, 2b, 3, 4a-4d and figure 8 are NOT approved;
figures 6 and 9 ARE approved.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 7, 16-20 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Wooden et al 394.

Wooden et al 394 discloses a dynamic polymer-based coating, comprising at least one patterned polymeric layer 416, 416' for attachment to a surface 410, said polymeric layer including at least one electrically conducting polymer as disclosed in column 4, lines 40-44, wherein a contact angle of said polymeric layer substantially increases or decreases upon at least one of oxidation and reduction by vibration of the film of polymers 416, 416'.

The vibration of the polymeric layer leads to the layer substantially expanding or contracting in at least one direction upon at least one of said oxidation and reduction. Wooden et al 394 also discloses a non-toxic biofouling preventative system comprising a polymer-based coating 416, 416', 418 disposed on a subsurface of a boat or ship 310, said coating comprising a polymeric layer 416, said polymeric layer 416 including at least one electrically conducting polymer as disclosed in column 4, lines 40-44, and a power supply 320 for supplying a dynamic electrical signal to said polymeric layer, wherein a contact angle of said polymeric layer substantially increases or decreases upon at least one of oxidation and reduction responsive to said dynamic signal by vibration of the polymeric layers.

The coating of Wooden et al comprises a pattern of a plurality of

micro scale or nanoscale features. Such features can any of the microscopic particles making up the layers.

The coating of Wooden et al 394 is a polymer composite, said composite including at least one non-electrically conducting polymer 416 mixed with said electrically conducting polymer, which is the cement discussed in column 4, lines 40-44.

In Wooden et al 394 the polymeric layer is a patterned polymer layer, the pattern being provided by layer 416, layer 418 and layer 416'.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4-6 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wooden et al 394.

Wooden et al does not disclose that the plurality of features provide a roughness factor of at least 2, that the roughness factor is at least 8 and that a spacing between adjacent ones of at least a plurality of said plurality of features is less than 2 μm .

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However, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to provide the surfaces of layers 416, 416' and the surface of layer 418 with a roughness factor of at least 8 for effective cementing of these layers together. It would further have been obvious to space the distance between the features less than $2\mu\text{m}$. That the particles making up the layers be closely spaced is required for the layers to be continuous.

8. Claims 10-12, 13, 15 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wooden et al 394 in view of Wooden et al 461.

Wooden et al 394 does not disclose an electrode layer disposed beneath said polymeric layer. Note the electrode layer 418 of Wooden et al 461. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to provide an electrode layer similar to 418 of Wooden et al 461 disposed beneath the polymeric layer 416'. Motivation to do so is to use such a layer to aid in activating the piezoelectric layer. Wooden et al discloses layer 118 as being an interdigitated pattern in one embodiment (see column 3, line 15), but does not disclose this pattern as comprising a plurality of micro scale or nanoscale features. However, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to make this pattern as comprising a plurality of at least micro scale features in order to provide good electrical contact with the piezoelectric layer.

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Wooden et al 394 does not disclose a capping layer disposed on said patterned polymeric layer. Note in Wooden et al 461, column 3, lines 15-18. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to provide a capping layer to layer 416' of Wooden et al 394 similar to that of Wooden 461 et al in order to protect this layer from the water as taught by Wooden 461.

Wooden et al 394 does not disclose a solid polymer electrolyte disposed between said plurality of features of said patterned polymeric layer. However, to incorporate such a layer into layer 418 of Wooden et al 394 would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Motivation to do so is to make the conductive sheet 418 more effective.

9. Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wooden et al 394 in view of Wooden et al 461 and Yoshida et al.

Wooden et al 394 as modified by Wooden et al 461 to have a capping layer does not disclose that the capping layer comprises a flexible polymer, said flexible polymer selected from the group consisting of silicones, polyurethanes, and polyamides and such a polymer being a non-electrically conducting polymer.

Yoshida et al. discloses that his piezoelectric polymer film is protected with a sheet of rubber or polyurethane.

In view of the teachings of Yoshida et al it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to make the capping layer provided to Wooden et al 394 in view of Wooden et al 461 of rubber. Motivation to do so is to provide a layer which will indeed protect layer 416' from the water.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wooden et al 394 in view of Angelopoulos.

Wooden et al 394 does not disclose layer 418 as comprising at least one polymer selected from the group consisting of polypyrrole, poly(p-phenylene) and polythiophene, and derivatives thereof.

Note the electrically conductive polymer adhesive of Angelopoulos which comprises at least polypyrroles. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to use polypyrroles in the adhesive cement of Wooden et al 394 in view of the teaching of Angelopoulos. Motivation to do so is to provide a cement which will make a good electrically conductive material.

Response to Arguments

11. Applicant's arguments filed October 17, 2005 have been fully considered but they are not persuasive.

12. Applicant argues that Wooden does not disclose or suggest Applicants' claimed "patterned polymeric layer".

In rebuttal, it is felt that Wooden et al 394 does disclose "at least one patterned polymeric layer for attachment to a surface", the layer being 416 and 416' of figure 2 and the pattern being that shown in figure 2. Layers 416 and 416' are polymers and layers 416, 418 and 416' form a pattern of layer 416, followed by layer 418 and followed by layer 416'. Claim 1 does not define an specifics of the pattern, and the pattern of layer 416 followed by layer 418 followed by layer 416' is within the many and varied definitions of a pattern.

13. Applicant argues that Wooden does not disclose or suggest Applicants' claimed "electrically conducting polymer".

In rebuttal, Wooden et al 394 does disclose the limitation of "said polymeric layer including at least one electrically conducting polymer". As pointed out in the rejection, the at least one electrically conducting polymer is the "electrically conducting cement..., such as a silver filled epoxy which polymerized at around room temperature". Is this not an electrically conducting polymer? The layer of 416, 418 and 416' includes at least one electrically conducting polymer 418. It does not matter that the silver provides the conductivity. If the silver is part of the polymer, than the polymer is conducting.

14. Applicant argues that Wooden does not disclose or suggest Applicants' claimed "contact angle of said polymeric layer substantially increases or decreases upon at least **one** of oxidation and reduction".

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In rebuttal, this limitation is anticipated by Wooden et al 394. Vibration of the outer layer 416' inherently changes the angle of contact of the this layer with respect to the water or the structure 410. Applicant has not defined in claim 1 what defines the contact angle.

The examiner gives the meaning of terms in the claims their broadest interpretation.

The contact angle can be considered to be between the outer layer 416' and the body of water or between layer 416' and structure 410. In either instance, when layer 416' vibrates this angle for particular portions of the layer is going to increase or decrease with respect to structure 410 or the body of water. Finally, the angle is going to increase or decrease for **one of** oxidation or reduction. In vibration of layer 416' there is going to be some type of reduction such as reduction of the curvature of a portion of the outer surface of layer 416' due to the change in curvature of this layer during vibration. Again, the examiner is giving this language the broadest interpretation and is not reading applicant's meaning of the term reduction into the claim.

15. Applicant's arguments with respect to claim 16 are noted. These arguments are similar to those for claim 1. As such the rebuttal of the arguments for claim 1 is felt to be sufficient in answering applicant's arguments with regard to claim 16.

16. Applicant argues: Several dependent claims are believed to recite independently patentable limitations. For example, claim 2 recites "said polymer layer substantially expands or contracts in at least one direction upon at least one of said oxidation and reduction". Claim 4 recites " said plurality of features provide a roughness factor of at least 2. The roughness factor (R) as defined in the application is defined as the ratio of actual surface area (R_{act}) to the geometric surface area (R_{geo}); $R = R_{act}/R_{geo}$). Claim

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7 recites "said polymeric layer is a polymer composite, said composite including at least one non-electrically conducting polymer mixed with said electrically conducting polymer". Claim 11 (dependent on claim 10) recites "said electrode layer is patterned, said pattern comprising a plurality of microscale or nanoscale features", while claim 12 (dependent on claim 11) recites "wherein said [electrode layer pattern] is interdigitated". Wooden does not disclose or suggest any of these limitations.

In rebuttal, the vibration of layers such as 416 and 416' of Wooden et al 394 causes them to at least retract in a direction toward and with respect to structure 410 upon at least reduction of the distance layer 416' is from structure 410.

In rebuttal, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to provide layer 416' with a roughness factor where it is cemented to layer 418. Motivation to do so is to allow for a good bond in that a surface with some roughness providing a better bond.

In rebuttal, the layer made up of 416, 418 and 416' is a polymer composite with layer 418, and layer 418 is the electrically conducting polymer layer while layers 416 and 416' are the non-electrically conducting layers.

In rebuttal, "microscale or nanoscale features" does not define exactly what features are microscale or nanoscale. In giving the meaning of microscale and nanoscale features the broadest interpretation, layers 416, 418 and 416' are going to have microscale or nanoscale features, such features being any of the microscopic particles making up the layers.

In rebuttal, Wooden 461 teaches the interdigitated pattern for the electrode layer.

Applicant's attention was directed toward column 3, lines 14-20 for this teaching.

17. In conclusion, the rejections stand.

Conclusion

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

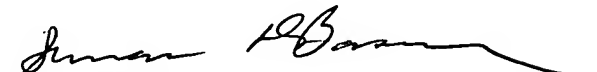
19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherman D. Basinger whose telephone number is 571-272-6679. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samuel J. Morano can be reached on 571-272-6684. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sherman D. Basinger
Primary Examiner
Art Unit 3617
10/31/05

10/31/05



Not
Approved
App 10/1/05
10/31/05
Ceb
983

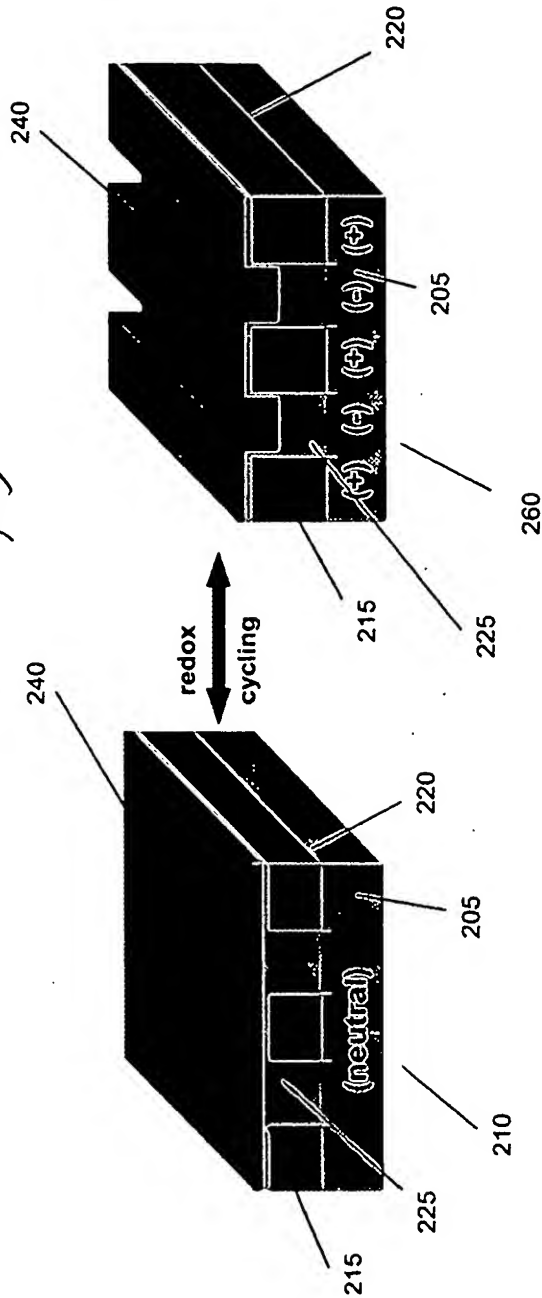


Fig. 2(a)

Fig. 2(b)

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Approved
10/31/05

300

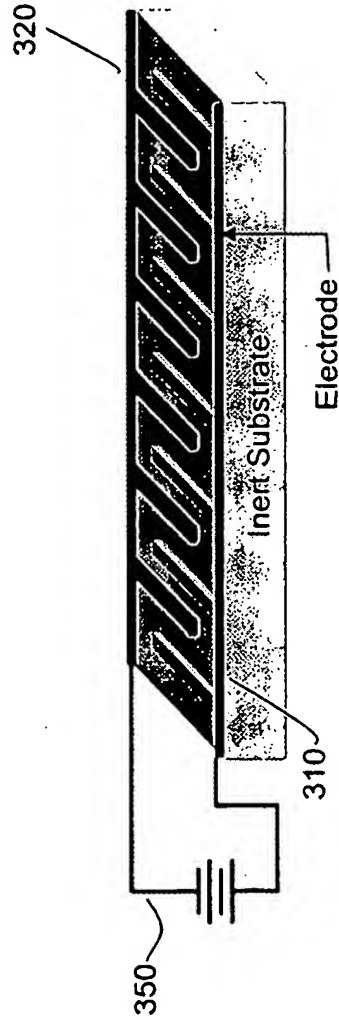


Fig. 3

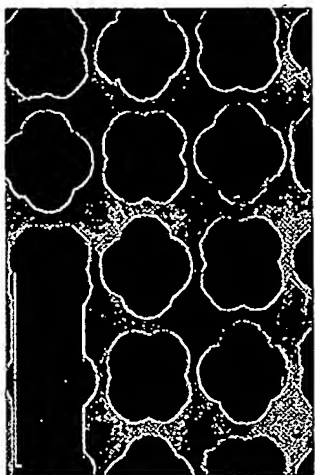


Fig. 4(b)

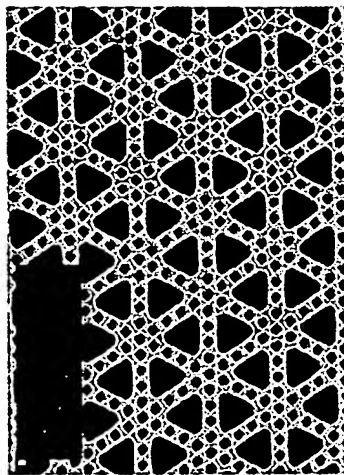


Fig. 4(d)

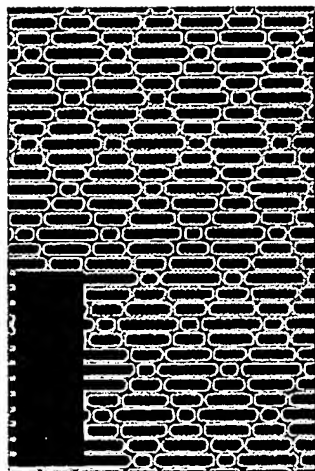


Fig. 4(a)



Fig. 4(c)

50/3/01
Sub
Gunnar

600

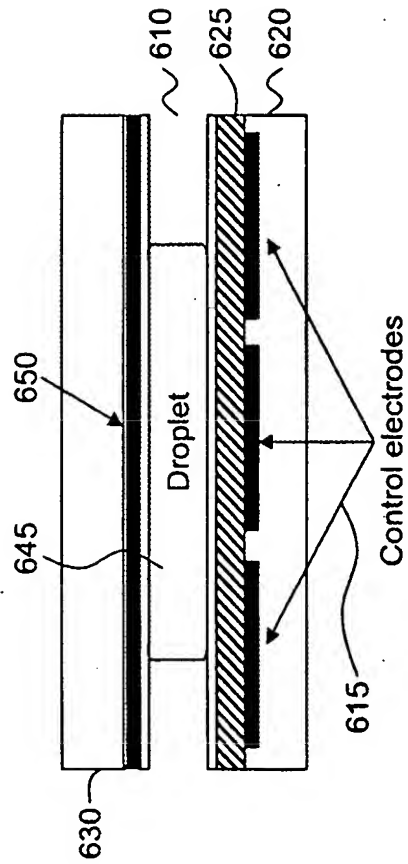


Fig. 6

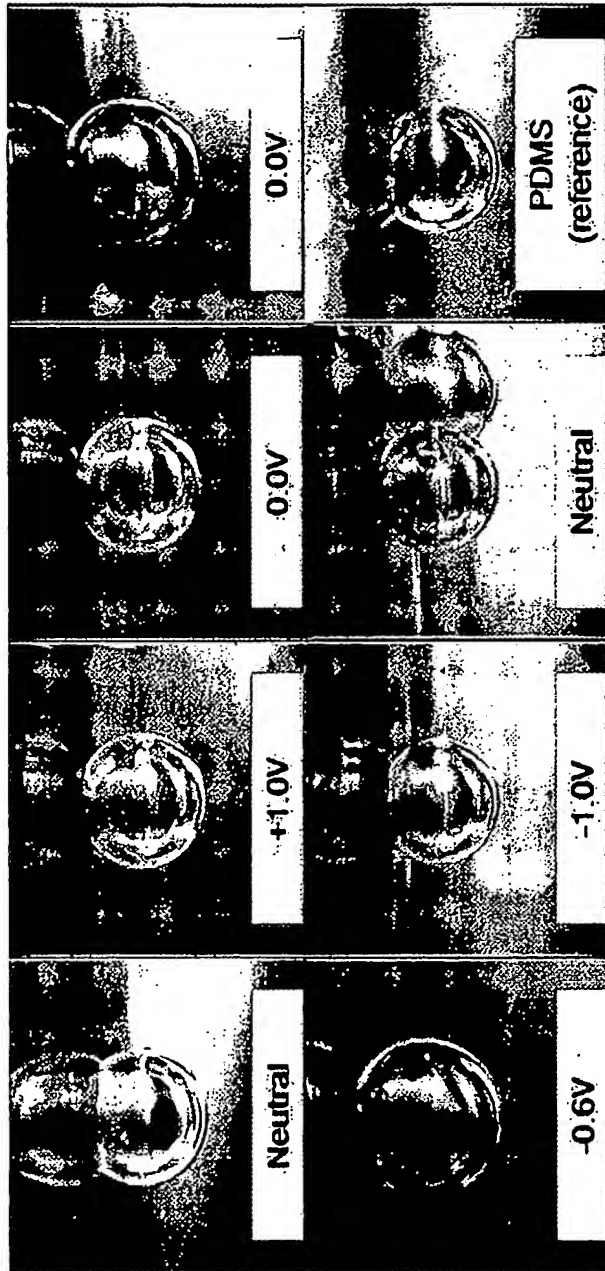


Fig. 8

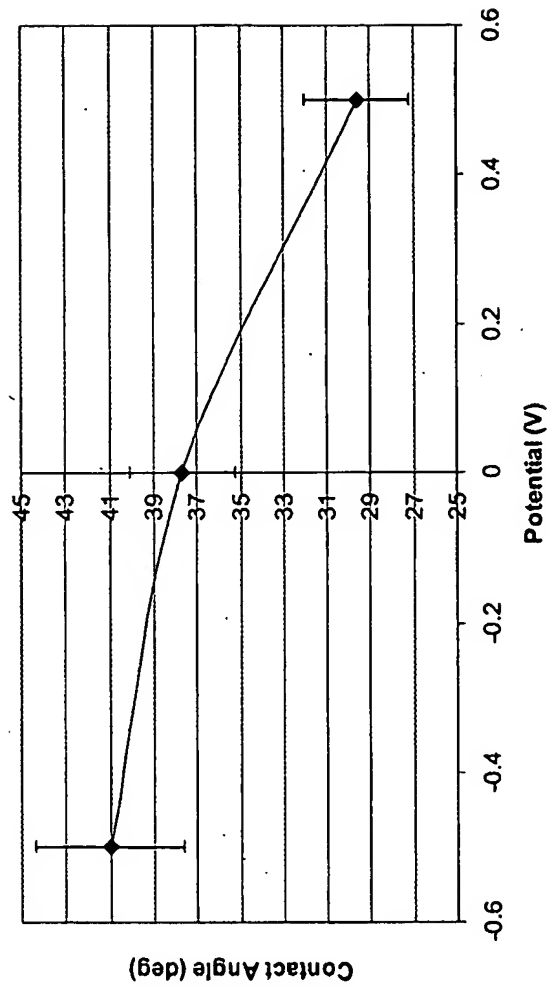


Figure 9